

Fishes

A Survey of Fishes in Terrapin Creek, Kentucky

Donovan Henry, Three Rivers Environmental Assessments

KDFWR Contact: Ryan Oster

Terrapin Creek, the only sizeable tributary of the Obion River in Kentucky, supports many fish species that have limited ranges, and are regionally endemic including: the Blacktail Redhorse (*Moxostoma poecilurum*), Least Madtom (*Noturus hildebrandi*), Brown Madtom (*Noturus phaeus*), Gulf Darter (*Etheostoma swaini*), Brighteye Darter (*Etheostoma lynceum*), and Firebelly Darter (*Etheostoma pyrrhogaster*). This watershed has been listed in the top five of highest priority for conservation management efforts that benefit the largest number of species; consequently, understanding ichthyofaunal species composition and abundance in Terrapin Creek is essential to future management and restoration efforts. The overall goals of this project are to: 1) compile relevant literature and historic/current information of the fishes of Terrapin Creek; 2) characterize and quantify the current fish community of Terrapin Creek; 3) compare the current fish community of Terrapin Creek to that of previous decades; and 4) prepare a final report with baseline data for future conservation monitoring. In 2007, we compiled relevant literature and historic and current information of the fishes of Terrapin Creek, established four sampling stations on Terrapin Creek, and began sampling fish assemblages at eight week intervals. Implementation and analysis stages of this project will continue in 2008 to attain the information necessary to manage conserve, enhance, and/or re-establish populations of these native and rare Kentucky fishes.

Funding Source: State and Tribal Wildlife Grant (SWG)

Comprehensive Wildlife Conservation Strategy: Appendix 3.3, Class Actinopterygii:
Priority monitoring needs by taxonomic class.



Sampling in Terrapin Creek/Donovan Henry

Conservation status and habitat of the Longhead Darter in Kinniconick Creek, Lewis County, Kentucky

David Eisenhour, Morehead State University, KDFWR Contact: Ryan Oster

Percina macrocephala, the longhead darter, is a large darter found in small to medium upland streams throughout the Ohio River basin. This taxon is sporadically distributed, absent from many large watersheds, and is considered critically imperiled in Kentucky. Three distinct populations of *P. macrocephala* exist: one in the upper Tennessee River system, a second in the Green River system, and a third in the upper Ohio River system. The only representative of the upper Ohio River system population in Kentucky is in Kinniconick Creek. Since the current range and abundance of this species in Kinniconick Creek is unknown, the objectives of this project are: to assess current distribution, estimate population size, and determine habitat use by *Percina macrocephala*. We began mapping Kinniconick Creek into sampling units and sampling fishes during 2007. We plan to continue this work in 2008; additionally, habitat assessments will be conducted and population sizes will be estimated. By continuing to document the range and abundance of this species in Kinniconick Creek, we will provide baseline data for comparison with later status surveys. Furthermore, our assessment of required habitat will be important when examining how changes in the use of the watershed affect the Longhead Darter.

Funding Source: State and Tribal Wildlife Grant (SWG)

Comprehensive Wildlife Conservation Strategy: Appendix 3.2, Class Actinopterygii, Priority Research Project #1 and Priority Survey Project #2.



Longhead darter/David Eisenhour

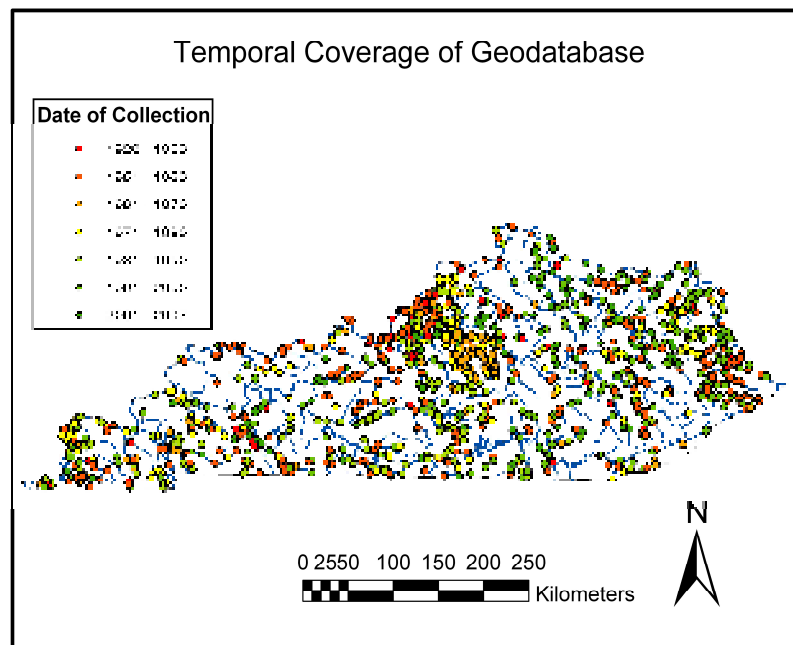
Databasing and Geo-Referencing Fish Collections from Kentucky

Brooks Burr, Southern Illinois University, KDFWR Contact: Ryan Oster

Of 242 fish species known from Kentucky, 59 are considered endangered, threatened, or of special concern. To effectively manage, conserve, and restore these imperiled fishes, accurate, up-to-date distributional records are necessary. The objective of our study is to identify, verify, digitize, and store fish collection records from Kentucky that currently exist at Southern Illinois University (SIU), which will greatly enhance the KDFWR ability to protect Kentucky's vast ichthyofauna. This is a multi-year project with three specific goals: 1) to digitize approximately 15,000 jars of fish from Kentucky that are currently only paper cataloged and generate latitude and longitude information for collections lacking this information; 2) to curate and digitize 15,000-23,000 jars of recently obtained fishes from the University of Louisville; and 3) to identify, sort, enumerate, paper catalog, computer catalog, and place in storage fishes collected recently by various agencies in Kentucky (over 20,000 individual fish records fit into this category). To date, we have completely cataloged and geo-referenced 15,000 paper records and 15,000 University of Louisville collection specimens. Additionally, we have sorted over 500 miscellaneous collections and delivered two hard-copy reports of computerized and geo-referenced records to Kentucky Department of Fish and Wildlife Resources. We will continue working to catalogue, geo-reference, and database collections until this project is completed (expected completion date: December 31, 2008).

Funding Source: State and Tribal Wildlife Grant (SWG)

Comprehensive Wildlife Conservation Strategy: Appendix 3.2, Class Actinopterygii, Priority Survey Project #1



Distribution, Habitat, and Conservation Status of Ichthyofaunal Species of Greatest Conservation Need in Kentucky

Matt Thomas, KDFWR

Kentucky contains one of the most diverse fish faunas in the United States, exceeded only by Alabama and Tennessee. This rich ichthyofauna is attributed to Kentucky's diversity of geologic features and abundance of water bodies, which has produced a plethora of aquatic habitats suitable for fishes. However, modifications of natural habitats are occurring at an ever-increasing rate and have had severe negative impacts on Kentucky's fish fauna. Collection data accumulated over the past 50 years reveal that many species are either extirpated, less abundant, or have more restricted ranges than formerly. Of the approximately 240 native fish species known to occur within the state, 59 have been identified as Species of Greatest Conservation Need (SGCN). In order to assess long-term population trends for these taxa, comprehensive data are needed regarding distributions, population size and structure, and habitat conditions. The objectives of this long-term project are to collect and compile distributional records, obtain population trend information, and develop procedures to attempt to preserve, enhance, and/or restore Kentucky's important ichthyofauna. During 2007, we conducted field surveys targeting Species of Greatest Conservation Need and have acquired new data regarding current distributions, population status, and associated habitat conditions for these fishes. Statewide field-surveys for SGCN, as well as collection of habitat parameters at field sites, will continue throughout 2008.

Funding Source: State and Tribal Wildlife Grant (SWG)

Comprehensive Wildlife Conservation Strategy: Appendix 3.2, Class Actinopterygii, Priority Survey Project #2 and Priority Research Project #1.



Matt Thomas

Evaluation of a 12.0-in Minimum Size Limit on Channel Catfish in Kentucky's Small Impoundments

Chris Hickey and Dave Baker, KDFWR

Since the mid-1990's, channel catfish population dynamics in small impoundments have received increased attention by fisheries managers as a result of their increasing popularity. Despite this increase in attention, catfish populations in small impoundments are primarily managed solely with creel limits and little data has been collected examining the effectiveness of this management strategy. In Kentucky, 80-100 public fishing lakes and small impoundments are annually stocked with approximately 150,000 hatchery-reared channel catfish.

Annual stockings are necessary to maintain catchable populations of channel catfish, as a result of poor natural reproduction, predation by largemouth bass, low survival, and high harvest rates. Stocked channel catfish typically range in length from 6.0-12.0 in (age-1+) at stocking and are stocked at densities of 10-25 fish/acre (some additional lakes receive 50 f/a). Limited creel data indicate that anglers harvest 30-63% of stocked channel catfish during each stocking year.

Prior to 2004, stocked channel catfish populations were managed with no minimum size or creel limits. Small size at harvest, low catch rates, and poor survival are characteristic of most of Kentucky's small impoundments stocked with hatchery-reared channel catfish, indicating overharvest. Beginning in 2004, a 12.0-in minimum size limit was enacted on eleven state-owned lakes and small impoundments to help improve populations of channel catfish. Unfortunately, virtually no data exists concerning channel catfish population dynamics in Kentucky's small impoundments. This study is intended to determine the effectiveness of a new 12.0-in minimum size limit, and assess its potential utilization in small impoundments statewide to improve the quality of the channel catfish fishery (increased densities, increased average length and weight, and increased survival of harvested catfish) in these small impoundments.

This study began in 2006, and we have used a variety of methods (e.g. spring/summer hoop netting and fall gill netting) to sample catfish within six target lakes in Kentucky. For each lake sampled, abundance, size structure, mortality, and age structure data are collected. Data obtained from this study will provide information needed to make management recommendations concerning the use of minimum size limits on stocked channel catfish populations in small impoundments throughout the state of Kentucky. The minimum size limit will possibly increase survival, growth, and abundance of larger (≥ 12.0 in) channel catfish, while potentially increasing angler catch rates, since newly stocked fish will be protected to a size at which individuals may become sexually mature and begin reproducing. Additionally, the overall size and weight of harvested channel catfish is expected to increase significantly. This study will also provide the Department of Fish and Wildlife Resources with alternative management strategies towards enhancing our channel catfish stocking program and managing small impoundments for quality channel catfish fisheries.

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Strategic Objective 5.



Channel catfish (small and large)/Ryan Oster

Evaluation of a 15-20 Inch Protective Slot Limit and 5 Fish Creel Limit on Rainbow Trout in the Lake Cumberland Tailwater

Dave Dreves and Jason Russell, KDFWR

Over the last decade, the Kentucky Department of Fish and Wildlife Resources (KDFWR) has attempted to optimize stocking practices in the Lake Cumberland tailwater, to increase the quality of the put-and-take rainbow trout fishery. The KDFWR commission passed new regulations for rainbow trout to be implemented on March 1, 2004. These regulations are a 15-20 inch protective slot limit with a creel limit of 5 trout per day (only one of which may be over 20 inches). These regulations are expected to protect enough rainbow trout to prevent overharvest and increase quality, yet still allow for a put-and-take fishery.

The primary goal of this project is to evaluate the effectiveness of these more restrictive regulations on rainbow trout in Kentucky's most valuable trout fishery. Additionally, Wolf Creek National Fish Hatchery annually stocks a minimum of 5 strains of rainbow trout, and long term performance of these various strains in the Cumberland tailwater is unknown. As part of the special regulation evaluation, we have differentially batch marked and stocked two rainbow trout strains in the tailwater (one domesticated strain and a relatively wild strain). We are currently conducting a strain evaluation to determine if there is differential growth and survival, and if the wild strain fish are less susceptible to angling.

Changes in the size and structure of the rainbow trout population as a result of the change in size and creel limit will be evaluated by relative abundance estimates from fall nocturnal electrofishing surveys. In addition, intensive electrofishing efforts will also be conducted in July of each to calculate population estimates of various size groups of rainbow trout using the Change-In-Ratio method. The catchable-size brown trout stocked each year will be used as the marked population. In the first year of the project, we determined monthly growth rates of rainbow trout during their first growing season by clipping the adipose fin of a cohort of fish and then collecting those fish each month after stocking by electrofishing. This will be repeated near the end of the study to determine if growth rates have slowed down indicating the trout population has reached the carrying capacity in the tailwater. The survival, growth, and contribution to the population and anglers creel of the two rainbow trout strains will be monitoring by conducting electrofishing surveys for fish previously marked with microwire tags and fin clips. We also conducted a creel survey in 2007 to assess changes in angler catch rates, harvest rates, and pressure in comparison to the 2002 creel survey. Results of these surveys will be used to guide management of this important Kentucky tailwater.



Rainbow trout/Dave Dreves

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Strategic Objective 5.

Evaluation of a 40-Inch Muskellunge Minimum Length Limit at Buckhorn Lake

Chris Hickey and Kevin Frey, KDFWR



Muskellunge sampling/ Kevin Frey

The muskellunge (*Esox masquinongy*) is an ecologically and economically important sport fish in many temperate fresh water ecosystems of North America. Fisheries management strategies for this species are most often directed towards establishing trophy fisheries through the use of regulations such as minimum size and bag limits. These regulations are designed to protect certain size classes of fish and equitably distribute the catch in order to develop the trophy fishery.

The Kentucky Department of Fish and Wildlife Resources maintains a muskellunge fishery in Buckhorn Lake,

Perry County, through yearly stocking efforts of 0.35 fish/acre (approximately 400 fish). In an effort to establish a trophy fishery, the KDFWR increased the minimum length limit for muskellunge in Buckhorn Lake from 30 to 40 in during the spring of 2003. Additionally, the daily bag limit decreased from two fish per day to one fish per day. The expected results of these regulation changes are to increase the abundance of muskellunge below 40 in and to increase the average length of all muskellunge in the population. However, due to the paucity of existing information pertaining to stocking efforts and the aforementioned regulation changes, little is known regarding what effects this management strategy will have on the muskellunge population as well as the entire fish community.

In order to evaluate the effects of the increased minimum size limit and decreased creel limit for muskellunge in Buckhorn Lake, pre-treatment data was collected early in 2003 before the regulation changes went into effect. Beginning in 2004, and continuing in 2007, we collected post-treatment data. Data collection entailed using electrofishing and fyke nets to survey and subsequently calculate catch per unit effort (CPUE), population estimates, length frequency distributions, condition, and diet data. We also marked all stocked muskellunge with unique fin clips each year to facilitate population monitoring (e.g. growth, condition etc.). Although sampling efforts have been focused on muskellunge; black bass and crappie catch per unit effort, length frequency data, age/growth, and condition from annual sampling (before and after the regulation change) will also be analyzed in an effort to determine any detrimental effects of the muskellunge regulation change.

A thorough evaluation of this management strategy will add to the existing knowledge base in the field and allow the KDFWR to most effectively manage the muskellunge fishery and fish community in Buckhorn Lake, as well as other muskellunge fisheries and fish communities in reservoirs throughout Kentucky.

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Strategic Objective 5.

Evaluation of Kentucky's Largemouth Bass Stocking Initiative

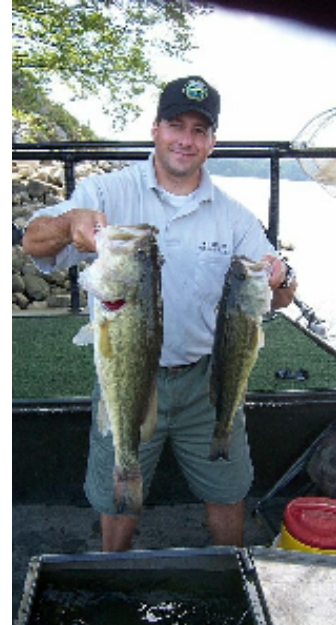
Chris Hickey and Dave Baker, KDFWR

Stocking of largemouth bass is an extremely common management practice throughout the continental United States. In Kentucky, largemouth bass have been stocked to supplement or maintain existing populations and to introduce bass to new environments. Limited production capabilities at the Kentucky Department of Fish & Wildlife Resources' (KDFWR) hatcheries necessitate the wise and efficient use of the limited largemouth bass hatchery production capacity. Stocking largemouth bass on top of strong and average year-classes is not the most efficient use of KDFWR limited resources. Ideally, a protocol could be developed to identify weak year-class production throughout Kentucky. Lakes displaying strong/average year-class production would not be stocked, enabling KDFWR to direct its limited hatchery resources to those lakes where a below average year-class has been produced.

In the fall of 2005, a stocking initiative was developed to augment weak year-classes of largemouth bass throughout Kentucky. Entitled "Kentucky's Largemouth Bass Stocking Initiative," this project is the first of its kind to take a proactive approach to identifying weak year-classes during the fall. When below average year-class production is observed, largemouth bass will be stocked in an attempt to establish an average year-class. The effectiveness of this initiative will be evaluated the following spring as largemouth bass recruit to age-1, where year-class strength is set. The long-term goals of this project are to determine: (1) if "Kentucky's Largemouth Bass Stocking Initiative" will augment weak year classes of bass through supplemental stocking of advanced fingerling largemouth bass; (2) if lake specific regression equations can be used to predict year class strength of largemouth bass; and (3) the impacts of stocking 5 and 10 f/a advanced fingerling largemouth bass to the largemouth bass population.

Since 2006, spring and fall electrofishing have been used to sample black bass to index year class strength of age-0 bass (fall) and to determine year class strength of largemouth bass at age-1 (spring). All black bass collected are measured to the nearest 0.1 in and a sample is sacrificed to determine age and growth; furthermore, catch per unit effort (CPUE) is calculated for each lake. Predicted abundance of age-1 bass will ultimately be calculated using either the linear regression of the fall catch rate of age-0 bass and spring catch rate of age-1 bass or the liner regression of the fall catch rate of age-0 bass (≥ 5.0 in) and the spring catch rate of age-1 bass.

Data obtained from this study will determine the utility of supplemental stocking of advanced fingerling largemouth bass throughout the state of Kentucky. This proactive approach will seek to minimize the time-lag that currently exists between the identification of a weak year-class and stocking to enhance weak year classes. Ultimately, this study will provide KDFWR with enhanced management strategies and efficient use of limited largemouth bass hatchery resources.



*Largemouth Bass sampling/
Paul Rister*

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Strategic Objective 5.

Evaluation of the Growth of Two Different Stocking Sizes of Blue Catfish Stocked into Three North Central Kentucky Small Impoundments

Chris Hickey and Dave Baker, KDFWR



Blue catfish tagging/Chris Hickey

To our knowledge, no studies exist that have evaluated survival and growth of blue catfish in small impoundments based on their size at stocking. The growth of blue catfish in small impoundments is dependent on a number of variables, and, at a mid-latitude area such as Kentucky, lake dynamics such as competition, fertility and available forage base may be driving blue catfish growth. These fish have been known to eat a variety of foods including invertebrates, crustaceans and fish; however, their growth can rapidly start to increase once they become primarily piscivorous. Blue catfish can start feeding on fish as early as 4 inches, but fish do not

become a primary component of their diet until they reach about 11 inches. If blue catfish are large enough to consume fish at the time of stocking (≥ 11 inches) it could result in greater growth in future years. The purpose of this study is to evaluate the growth of two different stocking sizes of blue catfish to determine if stocking catfish that are able to consume fish immediately results in greater growth potential and reduces the potential for the stocked fish to experiencing stunting.

To accomplish these goals, we selected three small impoundments in north central Kentucky to be used as study lakes. These include Reformatory Lake (53 acres) in Oldham County, Boltz Lake (90 acres) and Bullock Pen (134 acres), both in Grant County. Starting in 2007, all lakes were stocked in the late summer/early fall with blue catfish, reared at Kentucky's Peter W. Pfeiffer Fish Hatchery. Fish were divided into two size groups prior to stocking: fish greater than 12 inches in length and fish less than 10 inches in length. To facilitate later identification, all fish were injected with a micro-wire tag and received distinctive fin clips. Fish of both size groups were simultaneously stocked in each of the three lakes at a density of 20 fish/acre (10 fish/acre from the <10 inch group and 10 fish/acre from the >10 inch group).

Beginning in 2008, blue catfish at each lake will be sampled in late summer/early fall each year using low-pulse electrofishing. All blue catfish will be collected, checked for marks, measured to the nearest 0.1 inch and weighed to the nearest 0.01 lb. Stomach contents will be examined and identified to determine the primary prey type. This data will be used to calculate the growth rates of the stocked blue catfish and to help determine if there are any differences in growth rates between the two size classes of stocked catfish. This is a long-term project slated to continue through 2012, at which point we will have the necessary data to make management decisions regarding optimal stocking sizes of blue catfish in Kentucky's small impoundments.

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Strategic Objective 5.

Evaluation of Trophy Brown Trout Regulations and Stocking Strategies in the Lake Cumberland Tailwater

Dave Dreves and Jason Russell, KDFWR



Brown trout/Dave Dreves

Trout (*Oncorhynchus spp.* and *Salmo spp.*) sport fisheries in Kentucky's reservoir tailwaters are unique and important resources. These fisheries were created in reservoir tailwaters having coldwater discharges for either the entire year or a portion of the year. The Lake Cumberland tailwater trout fishery is the largest in Kentucky with 120 km of suitable habitat available throughout the entire year; furthermore, the Lake Cumberland tailwater receives the largest stocking in the state allocation with approximately 82,500 rainbow (*O. mykiss*) and 30,000 brown (*S. trutta*) trout stocked per year.

Growth and survival of stocked trout

in the Cumberland River are sufficient to create a high quality trout fishery with opportunities to catch trophy-size fish; however, Wolf Creek National Fish Hatchery (WCNFH), the sole source of trout for Kentucky, is currently at their maximum production of catchable-size (203 mm) trout. Though smaller trout can still be produced at WCNFH in greater quantities and at a lower cost, it is necessary to determine if stocking smaller fish is an effective fisheries management strategy. In order to increase the stocking rate of brown trout in the Cumberland River, we sought to determine if stocking smaller fish is an effective strategy (i.e. will these smaller fish reach a desirable size by harvest time?).

Since 1997, the Kentucky Department of Fish and Wildlife Resources (KDFWR) has been conducting research to determine optimal stocking practices in the Lake Cumberland tailwater to increase its potential as a trophy brown trout fishery. Specifically, KDFWR is evaluating the use of fingerling trout stockings to determine if densities of catchable-size (254 mm), large-size (330 mm), and trophy-size (451 mm) brown trout are increasing in the Cumberland River. Starting in 1997 and continuing in 2007, fall electrofishing has been used to collect data on brown trout distribution, and relative abundance, and monthly sampling has been used to collect information on growth rates. Trout have also been batch marked in the hatchery with wire microtags to facilitate mark-recapture population estimates. The value of stocking fingerling brown trout will be evaluated by comparing the proportions of fingerling to catchable-size trout at the time of stocking to their proportions in later electrofishing samples. Upon the completion of this study in 2009, KDFWR will have information necessary to optimally manage the Lake Cumberland tailwater brown trout fishery.

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Strategic Objective 5.

Evaluation of White Bass Stocking to Enhance Existing Reservoir Populations

Dave Dreves and Jason Russell, KDFWR

The white bass (*Morone chrysops*) is native to the southern Great Lakes, Mississippi River basin, and Gulf Coastal drainages and is notorious for having highly variable recruitment. However, the factors affecting recruitment in reservoirs are not yet completely understood. Since the 1980's, many Kentucky reservoirs have experienced severe declines in white bass populations, especially Barren River Lake and Dewey Lake. The cause of the declines in white bass fisheries at either lake are not completely understood, but may be related to a number of factors including increased siltation and deficiencies in physical parameters such as rainfall and/or reservoir inflow during consecutive years.

Typically, resource agencies have expended very little effort managing white bass populations. Realizing that white bass populations were going to undergo variable recruitment and the popularity of the fishery was often seasonal, fisheries managers preferred to live with the cyclic nature of the fishery and focus management efforts on other species. Current angler dissatisfaction over poor white bass populations in Kentucky reservoirs that historically had very popular fisheries has resulted in the need to try to develop new management strategies.

This study aims to determine if the stocking of white bass fingerlings at Barren River and Dewey Lakes can enhance the existing white bass populations and recruit to the reproductive stock, ultimately leading to the restoration of a self-sustaining high quality fishery. Concurrent monitoring of white bass population changes in relation to other biotic and abiotic variables over a number of years will give insight into factors affecting recruitment in Kentucky white bass populations. Beginning in 2003 and continuing in 2007, white bass fingerlings were stocked at a density of 30 fish/acre, and all stocked white bass were marked as fingerlings with OTC (Oxytetracycline) to facilitate mark-recapture population estimates and analysis of growth rates. White bass were sampled, using experimental gill nets, with a preferred minimum catch of 100 age-1 white bass. In addition, spring electroshocking was conducted in the headwaters of each of the study reservoirs to allow the determination of an index of overwinter mortality of stocked juvenile white bass. Beginning in 2008, white bass fingerlings will not be stocked at Barren River Lake and Dewey Lake to monitor the impact of no stocking on the production of natural year-classes. The study will continue for an additional 4 years with no stocking to follow the impacts of previously stocked year-classes and evaluate the strength of natural year-classes in the absence of stocking.



White bass/Dave Dreves

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Strategic Objective 5.

Impacts of Spawning Habitat Manipulations on Largemouth Bass Year-Class Production in Meldahl Pool, Ohio River

Doug Henley, KDFWR

November 1997, the Kentucky Department of Fish and Wildlife Resources (KDFWR) met with anglers dissatisfied with bass fishing in Meldahl pool, the second pool in the Kentucky portion of the Ohio River, as their catch rates had apparently declined. Bass tournament catch data from Meldahl pool indicates that a decline has occurred in angler success, progressively falling from 57% in 2000 to 36% in 2002. Electrofishing data shows that a relatively poor largemouth bass population exists in Meldahl pool as compared to other pools in the river. For example, in Markland pool, considered by many as having a good largemouth bass fishery, 2.3 fold more largemouth bass were collected and year-class production was 2.5 times greater than Meldahl pool. Low availability of critical habitats, including spawning habitat (gravel and cobble located near simple structure such as rocks, stumps, or logs), is known to negatively influence black bass populations. At Meldahl pool, the embayments have filled with silt from erosion and very little complex structure remains in the river (e.g. most gravel and cobble present in the stream channel is now under layers of silt).



Largemouth bass/Chris Hickey

It appears that the lack of spawning habitat, such as solid substrates and simple physical structure, in Meldahl pool may be negatively impacting largemouth bass populations. The goal of this project is to enhance the reproductive potential of largemouth bass in Meldahl pool and improve young-of-the-year largemouth bass and subsequent year-class contributions to the fishery by placement of artificial spawning structures in Meldahl pool, Ohio River.

Initial design and testing of artificial nesting structures began in the spring of 2003. In 2004, structures were installed in two embayments in the Meldahl pool to test the impacts of the artificial nesting structures on bass young-of-year production and subsequent recruitment to older ages. Two similar areas did not receive artificial spawning structures and will serve as controls. To monitor the success of these structures, we conduct electrofishing surveys during the spring and fall of each year (starting in 2004). During sampling, fish are sexed to determine ratio of males to females as well as the number of bass that may be “floaters” (mature males that do not spawn because of spawning habitat limitations). Since actual observations of nest use are not possible due to limited visibility in these embayments, artificial spawning structures are retrieved following spawning and observed for use by spawning bass for estimation of nesting density.

Additionally, each embayment is electrofished along transects (15 minutes each) covering the entire area in late August and again in early October. Parameters collected include catch per effort, length, and weight of all bass collected. Validation of the size cut-off between age-0 and age-1 bass is accomplished through a representative sample of otoliths taken each fall. This study, which we plan to continue through 2010, will provide important data on the efficacy of using artificial structures to enhance largemouth bass populations in embayments in Kentucky.

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Strategic Objective 5.

Investigation of the Restoration of Native Walleye in the Upper Barren River

Dave Dreves and Jason Russell, KDFWR

Walleye is a freshwater fish native to most of the major watersheds in Kentucky, including the Barren River watershed located in southwestern Kentucky. By the late-1800's, growing concern for declining fisheries prompted the stocking of Kentucky rivers and lakes by the U.S. Fish Commission and the Kentucky Game and Fish Commission. In 1912 and from 1914-1917, these two agencies stocked walleye fry in various rivers and streams throughout Kentucky, including the Barren River. Unfortunately, it was not yet known that the Lake Erie strain walleye used in the stocking efforts are adapted to lentic (lake) environments, unlike the native Kentucky walleye which are adapted to lotic (river) environments. Biologists later realized that these northern walleye are genetically distinct from native Kentucky walleye; as a result, it is believed that the majority of these stocked northern walleye could not survive in the river environment or were ultimately confined to lake systems (e.g. Lake Cumberland). Another walleye stocking attempt (4.15 million walleye fry) in the Barren River occurred in 1966, in response to low population numbers, shortly after the river was impounded in 1964. Since there are no known recent reports of walleye from the Barren River or Barren River Lake, it is suspected that the "northern" strain fry stockings in 1917 and 1966 were not successful and the native population in the river has been lost.



Walleye Fingerlings / Ryan Oster

Although the Barren River is impounded, there are approximately 31 miles of unimpounded mainstem of the Barren River above the reservoir. The broad goal of this project is to re-establish a reproducing native "southern" strain walleye population to the Barren River upstream of Barren River Lake. An established population of native walleye in the Barren River will serve as a source of broodstock for potential native walleye restorations in other Kentucky river systems and will create a walleye sport fishery in the upper Barren River. In order to accomplish these restoration goals, we collected native strain walleye from Wood Creek Lake in the spring and transported these fish to Minor Clark Hatchery to be used as broodfish. Walleye were spawned and reared in ponds to fingerling size (1.5 in.), then stocked in the Barren River in late May or early June. We used a stocking rate of a minimum of 20 fingerlings/acre (180 fingerlings/mile), and we plan to continue these efforts for up to five years. In addition to stocking, we assess 24-hour stocking mortality using mesh-lined barrels secured in the river. To monitor and assess stocking success, we sample walleye in the spring at multiple sites using pulse DC electrofishing gear, and a sample of walleye are collected such that weight and length measurements and sex ratios can be recorded. In the upcoming years, we plan to begin marking stocked fingerlings such that recruitment and growth rates of stocked fish may be determined. Walleye sampling in the Barren River is slated to continue for up to 8 years to allow for the reproductive potential of the stocked walleye population to reach a point where natural recruitment is possible and detectable.

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Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Strategic Objective 5.

Investigation of the Walleye Population in the Rockcastle River and Evaluation of Supplemental Stocking of Native Strain Walleye

Dave Dreves and Jason Russell, KDFWR



Walleye/Dave Dreves

Prior to impoundment in 1952, the Cumberland River was known for tremendous spring runs of walleye (*Sander vitreum*) that provided a very popular regional fishery. This fishery included the Rockcastle River, a tributary to the Cumberland River which enters at what is now the headwaters of Lake Cumberland. What was not known historically was that these native walleye are a genetically distinct stock adapted for lotic (river) environments. Walleye spawning runs at Lake Cumberland rapidly declined in the late 1950's and early 1960's due to a variety of factors including: 1) lack of spawning sites due to the inundation of rock shoals by the impoundment; 2) over-harvest of

adults during spawning runs; and 3) acid mine pollution of spawning areas.

Walleye were first stocked in the Cumberland River, above Lake Cumberland, in 1973 in attempts to improve the declining walleye fishery in the river. These broodfish were not from rivers in Kentucky, but were fish from Lake Erie origins, what we now know as "Lake Erie strain" walleye. The Erie strain walleye evolved in a lentic (lake) environment, thus they generally do not make large spawning migrations up rivers in the spring, but rather spawn within the lake or reservoir. Before advances in genetics, it was erroneously assumed that all walleye were the same and these stocked walleye would perform well in lotic environments. It is now believed that the majority of these walleye, because of their lentic origins, made their way back down into the lake and remained within the reservoir. Fortunately, no Erie strain walleye were ever stocked above the inundated portion of the Rockcastle River; consequently, Kentucky's unique strain of walleye still exists in the Rockcastle River, while Lake Cumberland continues to support the Erie strain.

There are two main goals of this study: 1) to assess the genetic origin of the existing walleye population in the Rockcastle River and what, if any temporal and spatial differences exist between the native strain and the Lake Erie strain; and 2) to evaluate the contribution of stocked native strain walleye to the existing population. To accomplish these goals, we conduct electrofishing surveys during various seasons and locations throughout the 54 miles of the mainstem Rockcastle River. Walleye are measured, weighed, tagged, released, and fin clips are taken for genetic analysis. Tagging these fish will allow future mark-recapture population estimates.

Additionally, we collect native strain walleye from the Rockcastle River each spring and transport them to Minor Clark Fish Hatchery to be used as broodfish. These walleye are spawned and reared to fingerling size (1.5 in). Target stocking rates are a minimum of 20 fingerling/acre (180 fingerlings/mile on the mainstem) or 2,000 fry/acre (18,000 fry/mile on the mainstem) for up to 5 years. Beginning with the 2008-2009 season, native walleye will not be stocked to determine the effect of stocking on the production of natural year-classes. No stocking will occur for three consecutive years to monitor for natural year-class production. To determine recruitment of stocked walleye, a sample of walleye will be sacrificed each year and the otoliths will be examined for OTC (Oxytetracycline) marks.

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Strategic Objective 5.

Lake Sturgeon Restoration in the Upper Cumberland River System

Matt Thomas and Steve Marple, KDFWR

The lake sturgeon (*Acipenser fulvescens*) was historically widespread in river and lake ecosystems from southern Canada to the southeastern United States. The distribution and abundance of this temperate, freshwater fish have been significantly reduced, with populations recently estimated to be approximately one percent of their original size. In Kentucky, the lake sturgeon is considered a “species of greatest conservation need” (SGCN), and was reported to be common in the upper Ohio River drainage prior to 1915. Within the past two decades, only five sturgeon records have been reported from the Ohio and Mississippi Rivers bordering Kentucky and populations appear to be incapable of natural recovery. To successfully restore populations of lake sturgeon, we sought to re-establish the lake sturgeon in the upper Cumberland River drainage, where they once commonly occurred, through artificial culture and restocking. In 2007, we acquired fertilized sturgeon eggs from the Wisconsin Department of Natural Resources and transported them to the Peter W. Pfeifer Fish Hatchery in Frankfort, Kentucky. We currently have approximately 290 fish, ranging in size from 4.5 to 12 inches total length. Although the first release into the Cumberland River is planned for the end of April, 2008, we plan to hold 20-30 individuals for future implantation of radio-transmitters. Upon release of this initial cohort of sturgeon in 2008, we will acquire additional eggs from the Wisconsin Department of Natural Resource to continue captive rearing efforts. The ultimate long-term benefit of this project is to create a self-sustaining population of lake sturgeon in the Cumberland River from Wolf Creek Dam, upstream to Cumberland Falls (including the Big South Fork and Rockcastle River).

Funding Source: State and Tribal Wildlife Grant (SWG)

Comprehensive Wildlife Conservation Strategy: Appendix 3.2, Class Actinopterygii: Priority Research Project #8. KDFWR Strategic Plan. Goal 1, Strategic Objective 4d.



Lake sturgeon/ Matt Thomas

Life History and Population Status of the Blacktail Redhorse in Terrapin Creek, Graves County, Kentucky

*Brooks Burr and Robert Gerwig; Southern Illinois University Carbondale,
KDFWR Contact: Ryan Oster*

The Blacktail Redhorse, family Catostomidae, reaches the northernmost limit of its range in Terrapin Creek, Graves County, where it is sporadic and rare. Terrapin Creek lies in the Eastern Gulf Coastal Plain and is of considerable ichthyological importance, harboring six species of fish otherwise unknown from the state. The Blacktail Redhorse is considered imperiled in Kentucky, and is one of 59 fish taxa identified as Species of Greatest Conservation Need (SGCN) within the state. The biology of this species has received little attention; therefore, an examination of the life history and population status, especially the possibility of Terrapin Creek supporting a reproducing population of Blacktail Redhorse, is essential for future conservation of this species. The primary objectives of this study are to: 1) determine if the population of Blacktail Redhorse in Terrapin Creek is reproducing within the watershed; 2) elucidate life-history aspects (spawning dates and duration, spawning habitat, ages and sizes, food habits, seasonal migrations, etc.) which may be used to develop a conservation management plan; 3) estimate population size and demographics; and 4) identify critical habitat and make recommendations for a modular stream that mirrors natural habitat where propagation can eventually be accomplished. In 2006 and 2007, we established eight sampling sites in Graves County, within the Terrapin Creek watershed, and made eighteen sampling trips throughout the year to sample these sites. Data summary and analysis efforts will continue in 2008 to provide necessary information for a comprehensive conservation strategy for the Blacktail Redhorse.

Funding Source: State and Tribal Wildlife Grant (SWG)

Comprehensive Wildlife Conservation Strategy: Appendix 3.2, Class Actinopterygii: Priority Research Project #1 and Priority Survey Project #2.



Blacktail redhorse/Matt Thomas

Monitoring and Management of Ohio River Sport Fisheries

Doug Henley, KDFWR

Since fish populations are dynamic and are constantly changing, it is apparent that routine monitoring of the sport fish population status in Kentucky is necessary in order to adequately manage populations amidst increasing recreational and environmental pressures. The Ohio River is a primary source of sport fish in Kentucky and, since the Ohio River serves as a boundary between the Commonwealth of Kentucky and the states of Illinois, Indiana, and Ohio, the authority and responsibility for the protection and management of this fishery is vested in each of these states. However, it is recognized that numerous Ohio River fishery issues of common concern exist among the states bordering the river. The goal of this project is to develop and implement a monitoring program for selected sport fish populations and their fisheries in river systems in Kentucky. As a major part of this project, we hope to enhance long-term Ohio River fishery management efforts through the participation in the Ohio River Fish Management Team (ORFMT), a collaboration in interstate fishery management issues between all six states (Kentucky, Illinois, Indiana, Ohio, West Virginia, and Pennsylvania) bordering the Ohio River.



Blue Catfish/Doug Henley

Creel surveys and sport fish population trend data are needed on the Ohio River and other rivers in Kentucky to implement and verify fish management strategies and goals, and part of this project involves active participation by KDFWR in ORFMT to initiate multistate fish surveys on the Ohio River. To collect population trend data, electrofishing, gill nets, and trap nets have been used on sauger, black bass, crappie, catfish, and Morone species from the Ohio River and other river systems since 2003. Information collected includes age/growth, CPUE, proportional stock density, relative stock density, relative weight, and young-of-year indexing. Most of these population surveys occur during the fall when river conditions are most stable.

We also use stratified random sampling to establish dates, sites, and times for creel survey. Fishery statistics collected on rivers include total pressure, catch composition, length frequency, catch rates, harvest rates, and species sought. Information has been collected on all species of fish captured by anglers. On the Ohio River, use of the 150 foot restricted zone by anglers is documented by the creel clerk during counts. Anglers are asked a series of questions during each interview to profile angler attitudes on various pertinent issues including their expectations regarding catch and trip quality, regulations, access, fish consumption, and fish management strategies. These data are important in determining management practices for sport fish along the Ohio River and other river systems in Kentucky.

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Objective 5.

Monitoring Trends in Black Bass Fisheries

Chris Hickey and Dave Baker, K DFWR

The Kentucky Department of Fish and Wildlife Resources (KDFWR) routinely samples black bass populations in reservoir and public lakes throughout the state and each year performs creel surveys on a limited number of water bodies. The current databases, particularly with respect to angler success and angler catch rates, are very limited. The cost of conducting electrofishing and creel surveys for consecutive years to assess relationships between bass populations and angler catch is often cost prohibitive; however, knowledge of these relationships is beneficial in a management context. One source of catch rate data for black bass that has not yet been utilized by KDFWR comes from black bass tournaments that are held throughout the state every year. The goal of this project is to use black bass tournament data to calculate black bass catch rates (fish/hour) on waterbodies in Kentucky.

Beginning in 2004, organized bass clubs throughout Kentucky have participated in an annual survey and provided details on each tournament fished for the year. All forms are returned annually to KDFWR by December 31 to allow for keypunching, editing, and tabulation. Data are summarized by lake and include the number of tournaments held, number of entries, angler hours, angler catch rates, percent success, total weight of fish caught, number of fish over four pounds, number of fish over six pounds, big fish caught, number of each species of black bass caught, and weight of fish caught.

The information obtained from this study provides needed angler catch and success rate data and fishing pressure estimates for black bass on a large number of lakes throughout the state each year.

This information will ultimately be used to build a long term database that can be used in monitoring trends in black bass fisheries on a statewide basis that may result in improved management of black bass. These data can also be correlated with other survey information (i.e. year class strength data) and increase our ability to explain and forecast changes in black bass abundance. This effort will also maintain and promote a close working relationship between organized bass anglers and KDFWR.



Largemouth bass tournament / Chris Hickey

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Strategic Objective 5.

Ohio River Largemouth Bass Supplemental Stocking Study

Doug Henley and Chris Hickey, KDFWR



Largemouth bass fin clipping / Chris Hickey

Supplemental stocking in large riverine systems has been shown to benefit largemouth bass populations, especially when bass populations lack sufficient nursery habitat and recruitment is low. Results of a 1997 study indicate that largemouth bass populations in the Ohio River occur at low densities and year-class production is also low; consequently, supplemental stocking may be a means to enhance year-class strength of largemouth bass in these embayments. This would ultimately result in improvement

in the largemouth bass fishery. The primary objective of this study is to determine if the stocking of 1.5 inch fingerling largemouth bass in major embayments of Markland Pool can be used as a management tool to enhance largemouth bass populations in the Ohio River.

Beginning in 2007, largemouth bass fingerlings produced at the Minor E. Clark Fish Hatchery were stocked in Markland Pool in June at a target stocking rate of 100 fish per acre. Largemouth bass fingerlings were marked with oxytetracycline (OTC) for later identification. Fingerling bass were stocked in 19 embayments, and, when feasible, stockings occurred at several sites within each embayment. To monitor stocking efforts, night electrofishing surveys will be conducted in the spring and fall of 2008 through 2012.

This is a long-term study, and we plan to monitor the contribution of the stocked bass to the population through at least age-3. By age-3, largemouth bass attain the length of 12 inches and are recruited into the fishery. During the fall, all young of year fish will be kept for otolith analysis in the lab. With each succeeding year, a smaller random sample of fish will be taken. Otoliths will be removed from fish, aged, and examined for OTC marks at the Frankfort Office using a ultra-violet compound microscope. Data collected from sampled fish will include lengths, weights, catch-per-unit-effort, relative abundance, and habitat preferences. Differences in growth between stocked and wild fish will also be monitored.

Since habitat is very important to the survival of stocked largemouth bass, we plan to quantify the amount of useable habitat within each study embayment. Habitat will be described and approximate area coverage will be quantified within each embayment. Morphology of each embayment will be examined with a depth sounder, transects, and aerial photographs. Upon completion of this study, we will have the data necessary to assess the success and feasibility of supplemental stocking of largemouth bass in Markland Pool.

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Objective 5.

Preliminary Assessment of a Newly Established Blue Catfish Population in Taylorsville Lake

Chris Hickey and Dave Baker, KDFWR

Blue catfish provide valuable sport fisheries, commercial fisheries or a combination of the two. In Kentucky populations of blue catfish provide both sportfishing and commercial fishing opportunities. There are currently no size or creel limits for blue catfish in Kentucky, and gear restrictions, if any, are very limited. Some of the small public lakes and reservoirs that have been recently stocked with blue catfish have the ability to develop into high quality sport fisheries with trophy potential, but the dynamics of these populations are currently not well known. The purpose of this study is to collect critical population statistics on the blue catfish stocked into Taylorsville Lake and to determine if there are any suitable management options that can be used to create a high quality fishery with trophy potential.

Beginning in 2007, we used summer low-pulse electrofishing to determine abundance and size structure of the blue catfish population in Taylorsville Lake. During this period, ten blue catfish per inch class were sacrificed and otoliths were removed to determine age, growth and total mortality. The stomach contents of the sacrificed fish were also analyzed to generate some preliminary food habit data. We also used low-pulse electrofishing in the summer, prior to the yearly stocking, to sample any young-of-the-year blue catfish that were a result of natural reproduction. Additionally, we used fall low-pulse electrofishing to gather data for relative weights of blue catfish from Taylorsville Lake.

For the 2008 portion of the study, we plan to gather and tag a minimum of 1,000 fish, release these fish, and offer a small reward as an incentive to encourage anglers to turn in any tags they remove from blue catfish. Data from this up and coming portion of the study will allow us to determine what portion of total mortality can be attributed to angling. This project will continue through 2010 and data obtained will be used to determine the success of the blue catfish stocking at Taylorsville Lake and provide information needed to make management recommendations that will result in a high quality blue catfish fishery with trophy potential.

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Objective 5.



Blue catfish / Dave Baker

Preliminary Assessment of Bluegill and Redear Sunfish Populations in Small Impoundments

Dave Dreves and Jason Russell, KDFWR

Department-owned small impoundments in central Kentucky are noted for providing good fisheries for both bluegill (*Lepomis macrochirus*) and redear sunfish (*L. microlophus*). One technique employed by the KDFWR to manage for the bluegill fisheries is to not stock shad in these waters or selectively remove them from impoundments to be managed for sunfish, thus eliminating a potential competitor and leaving bluegill as the primary prey of largemouth bass. The direct and indirect effects of gizzard shad have been shown to affect both bluegill growth and population size structure. The KDFWR maintains the bluegill fisheries in these small impoundments by undertaking shad removal efforts with low concentration rotenone application where shad introductions have occurred and occasional fertilization to increase production. However, no size limits and very limited creel limit restrictions (Cedar Creek Lake and Greenbo Lake) for bluegill have ever been imposed by KDFWR.



Bluegill/Dave Dreves

When considering harvest restrictions such as length limits, estimates of exploitation, natural mortality, and growth rates are more valuable than other measures such as size structure or angler catch rates. Preliminary data is necessary to calculate growth and mortality rates for bluegill and redear sunfish in these small impoundments before those fisheries could be managed effectively with length limits. Given the absence of data to support harvest restrictions, the goals of this study are to: 1) determine the growth, mortality and exploitation of bluegill and redear sunfish in three central KY impoundments (Beaver, Elmer Davis, and Corinth Lakes); 2) calculate a recruitment index; and 3) monitor the seasonal physicochemical characteristics of each lake and relate these characteristics to population dynamics.

Beginning in spring 2006 and continuing in 2007, we collected bluegill and redear sunfish by electrofishing gear during May in each of the 3 study lakes. A total of 10 fish per inch class were sacrificed and otoliths removed for calculation of age, growth, and mortality. Fall electrofishing was also conducted to calculate relative weights of both species. We visited each lake at least monthly from May through October to monitor physicochemical conditions. Several stations were established at each study lake where we measured monthly temperature/dissolved oxygen profiles at 3 ft. intervals; turbidity was measured with a Secchi disk. We plan to compare the fish population data with the physical observations made at each lake and trends will ultimately be analyzed.

These data will then be used to model various regulation schemes to determine if minimum size limits or creel limits can be used to enhance the bluegill or redear sunfish populations in the study lakes and/or applied to other lakes across the state. The expectation is that the conclusions generated by this research will result in increased quality of bluegill and redear sunfish fisheries in small impoundments in Kentucky, thereby leading to increased angler satisfaction.

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Objective 5.

Relationships Between Primary Productivity and creation of a Trophy Largemouth Bass Fishery: Monitoring and Management of Cedar Creek Lake

Chris Hickey and Dave Baker, KDFWR

Black bass (largemouth, smallmouth, and spotted bass) are the most sought after game fish in Kentucky. Although ample opportunities exist for quality bass angling around the state, a true “trophy bass” lake in Kentucky does not yet exist. Successful creation of a trophy bass lake depends on many factors including: largemouth bass growth rates, bass condition, available forage base, degree of competition with other predatory species, a reasonable travel distance for anglers, and complete regulatory control by the state agency. The productivity of the lake is also important and in many cases this can be

the limiting factor in the production of trophy bass. Productivity is usually greatest after the initial construction and filling of a reservoir. This increased productivity level is due to a large influx of organic detritus, creation of high quality habitat and food for benthic organisms, and a rapidly expanding lacustrine environment. By taking advantage of the initial increased productivity of a new reservoir, one may increase the chances of successfully creating a trophy bass fishery. The Kentucky Department of Fish and Wildlife Resources has the opportunity to create such a fishery from a newly constructed reservoir, Cedar Creek Lake, Lincoln County, which was constructed in 2002. The specific goal of this project is to create a self sustaining trophy bass/forage population through the use of special management regulations and careful monitoring of lake productivity.

Since 2004, we have collected water samples annually to assess primary productivity in Cedar Creek Lake (via analysis of chlorophyll A, nitrogen, phosphorus, pH etc.), and we have employed spring and fall nocturnal electrofishing each year to assess largemouth bass density, length frequency, size structure, condition, and recruitment success. Starting in 2005, we also collected otoliths from a subsample of largemouth bass to determine length at age, growth rates, and mortality estimates. Each summer, we collect largemouth bass using electrofishing gear to analyze stomach contents to assess food habits. Lastly, early summer diurnal electrofishing is used each year to assess forage quality by collecting data on the density, length frequency, size structure, and age/growth parameters of bluegill sunfish. Ultimately, we will compare growth rates and other parameters to those in other water bodies in Kentucky to verify if current growth rates of bass in Cedar Creek Lake allow for a trophy fishery. If we find that Cedar Creek Lake will allow for a trophy bass fishery, we will use these data to guide management decisions and increase the satisfaction of Kentucky’s largemouth bass anglers.



Largemouth Bass / Ryan Oster

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Objective 5.

Taxonomic Resolution, Life History, and Conservation Status of the Undescribed “Sawfin” Shiner and Kentucky Arrow darter

Matt Thomas, KDFWR

The undescribed Sawfin Shiner, *Notropis sp. cf. spectrunculus*, and Kentucky Arrow Darter, *Etheostoma sagitta spilotum*, are two recognized taxa with very restricted distributions in Kentucky. Populations of these fishes are either thought to be declining (Kentucky Arrow Darter) or of unknown status due to insufficient information (Sawfin Shiner). The range of the Kentucky arrow darter falls entirely within the political boundaries of Kentucky, where it is endemic to the upper Kentucky River drainage, and the sawfin shiner reaches the northern limit of its range in Kentucky. Both fishes



Sawfin Shiner/Matt Thomas

are considered species of greatest conservation need (SGCN) in the Commonwealth. The principal objectives of this study for each species are to: 1) resolve taxonomic status and provide formal descriptions and diagnoses for known and putative undescribed species; 2) conduct life history studies to determine habitat use/requirements, spawning location and timing, fecundity, diet, competition, and population dynamics; 3) update information on distributions and estimate the current status and size of populations, and establish baseline data where needed; and 4) document locations and condition of critical habitat and provide information on potential recovery and management measures for these species. In 2007, we began efforts to determine the current spatial distribution and habitat use of these species via field surveys using a combination of seining and backpack electrofishing. Throughout 2008, we will continue this field work in the upper Kentucky River drainage and the Cumberland River drainage below Cumberland Falls to acquire data necessary for management and conservation of these two rare endemic taxa.

Funding Source: State and Tribal Wildlife Grant (SWG)

Comprehensive Wildlife Conservation Strategy: Appendix 3.2. Class Mammalia: Priority Research Projects 1 and 3. Priority Survey Project #2.



Arrow darter/Matt Thomas

The Use of Flathead Catfish to Reduce Stunted Fish Populations in a Small Kentucky Impoundment

Kathryn Emme, KDFWR



Flathead catfish/Kathryn Emme

Fish populations in A.J. Jolly Lake, a 175-acre lake located in Campbell County in northern Kentucky, are considered poor. Sport fish populations are hampered in this lake because of the presence of slow growing bluegill (*Lepomis macrochirus*) populations (which reach 6 inches in length at 6 years of age), an abundant population of green sunfish (*Lepomis cyanellus*), and multiple other undesirable species. Bluegill reaching lengths larger than seven inches have not been documented from this lake; additionally, KDFWR biologists have found largemouth bass populations at A.J. Jolly Lake to be relatively poor as well. In 2003, electrofishing catch

per unit effort (CPUE) of < 8.0 inch largemouth bass was only 14.5 fish/h, while densities of \geq 15.0 inch largemouth bass were only 7.5 fish per hour. In contrast, comparable-sized lakes such as Boltz and Bullock Pen Lakes (both in north Kentucky) had largemouth bass densities of 40.3 fish per hour and 56.5 fish per hour respectively.

In 2007, we began efforts to increase the population size of flathead catfish (*Pylodictis olivaris*) in A.J. Jolly Lake in an effort to determine if stocking of this additional predator will improve sport fish populations. Specific goals of this project are to: 1) reduce the density and improve size structure and growth of bluegill; 2) improve year-class strength, age structure, and densities of largemouth bass; 3) reduce densities and improve age structure and growth of channel catfish; and 4) reduce densities of undesirable fish species such as green sunfish. On 29 June 2007, we stocked a total of 417 flathead catfish in A.J. Jolly Lake at a rate of 2.0 fish per acre and 6.5 pounds per acre. These fish ranged in length from 8.4 to 36.0 inches and weighed between 0.5 and 20.0 pounds. We plan to use low pulse electrofishing, daytime pulsed-DC electrofishing, and tandem small hoop nets to sample flathead catfish, largemouth bass, sunfish, and channel catfish so that catch per unit effort, age structure, weights, and relative abundance values may be determined and assessed over time. This is a long-term project slated to continue for several years; ultimately, we will be able to assess the efficacy of using supplemental flathead catfish to improve sport fish populations in similar lakes in Kentucky.



Flathead catfish stocking/Kathryn Emme

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 1, Objective 5.

Urban Fishing Program in Kentucky

Kathryn Emme, KDFWR



In 2004, the Kentucky Department of Fish and Wildlife Resources (KDFWR) began targeted efforts to develop high-quality urban fisheries in the Commonwealth. These efforts are a response to the dramatic increase in Kentucky's urban population from 1990 through 2002 (24% increased during this 10-year period), and the desire by KDFWR to provide urban residents with increased fishing opportunities. By expanding urban fishing opportunities, we hope to provide social, recreational, educational, and environmental benefits and

potentially increase participation in recreational fishing and support for statewide fishery programs. In order for this urban fishing program to be successful, there is a need for these urban waters to be intensively managed to provide for a high quality fishery with corresponding high angler success.

To successfully implement the urban fishing program, KDFWR identified five priority urban lakes on which to focus initial stocking efforts: Miles Park Lake and Tom Wallace Lake in Jefferson County, Upper Sportsman's Lake in Franklin County, Middleton Mills Park Lake in Kenton County, and Alexandria Lake in Campbell County. For each of these targeted lakes, urban fish management plans have been created and implemented. Each plan contains detailed information regarding species of fish stocked, numbers stocked, size of fish stocked, and number of stockings. We also established creel and size limit regulations and, when necessary, implemented additional management activities such as: fertilization, artificial feeding, habitat improvement, and improvements in bank access and parking areas.

Over the past year, we have increased the number of fishing events that target urban youth, families, seniors, and the disabled and economically disadvantaged. These special programs are designed to increase: (1) participation in fishing in urban areas; (2) fishing skills; (3) knowledge of ecosystems; (4) angler ethics; and (5) enjoyment and appreciation for fishing. The success of this project will ultimately be evaluated by performing fishing population surveys, angler creel surveys, and angler attitude surveys. These data will be used to determine the success of the urban fishing program in Kentucky and to identify effective ways to increase the quality of fishing experiences for urban residents.

Funding Source: Sport Fish Restoration Program (Dingell-Johnson)

KDFWR Strategic Plan. Goal 2, Strategic Objective 3.

Using GIS-based Techniques for Aquatic Conservation in the Upper Green River Drainage, Kentucky

Brooks Burr, Tonny Oyana, and Robert Hopkins, Southern Illinois University

KDFWR Contact: Ryan Oster

The upper Green River drainage, including both the upper Green and Barren Rivers, has been identified as a Priority Aquatic Conservation Area (PACA) due to the high species richness of both mussels and fishes found in these drainages. Eighteen fish species and 23 mussel Species of Greatest Conservation Need (SGCN) occur in these systems, which are presently threatened by non-point source pollution, inadequate forest management, and modified flow regimes. Although conservation efforts, including land acquisition, stream flow management, and watershed stress analyses, have been employed to conserve and protect the aquatic fauna of the upper Green River proper, these efforts exclude the Barren River and lack a true landscape management component. The objective of this project is to create a GIS-based framework for deriving watershed management and conservation recommendations for fish and mussel species of concern in a critical PACA in central Kentucky. Thus far, we have created two landscape/land use maps of the upper Green River drainage which include the upper Green and Barren Rivers, and we have characterized landscape-level changes through time at multiple spatial scales. Evaluating changes in land use/land cover has allowed us to begin assessing relationships between population distributions and landscape dynamics.

Throughout 2008, we will characterize the influence of environmental variable on the presence/absence of rare and uncommon mussel and fish taxa, create spatiotemporal distributional models for each taxon of interest, and use spatial modeling and mapping techniques to identify priority areas for conservation, restoration and/or species reintroduction. We ultimately expect to develop landscape-level, GIS-driven management techniques for rare aquatic species in the upper Green River watershed.

Funding Source: State and Tribal Wildlife Grant (SWG)

Comprehensive Wildlife Conservation Strategy: Appendix 3.2. Class Actinopterygii: Priority Survey Project #4. Appendix 3.3. Conservation Action #80.

